

# UNIVERSAL MEASURING DEVICE FOR MEDICAL APPLICATION

The invention relates to a measuring device for medical application, comprising a  
5 first part provided with measuring means for measuring data of a patient, and a second  
part provided with communication means for sending the data, wherein the first part can  
be releasably connected to the second part.

Known from the international patent application WO 02/07595 is a connector unit  
for receiving a disposable catheter for performing urological measurements. In the  
10 catheter is arranged a pressure sensor for measuring diverse pressure-related data. The  
connector unit can be connected by means of electrical wiring to peripheral equipment for  
the purpose of sending the data thereto.

It is a general object of the invention to provide a universal measuring device for  
medical application with an increased number of possible uses.

15 The measuring device according to the invention has the feature that the  
communication means are wireless.

The possible uses are considerably increased through the application of wireless  
communication, because of the fact, among others, that the patient and the peripheral  
equipment do not have to be located in the same space. In addition, the measuring device  
20 according to the invention is extremely easy to use, which increases user convenience to  
a significant extent. The absence of wires moreover increases the freedom of movement  
of the patient to a significant degree.

In a first preferred embodiment the first part is a disposable article. The measuring  
device is hereby based on the principle of once-only use or use by one patient at most,  
25 and thereby satisfies the highest requirements in respect of hygiene.

In a second preferred embodiment the first part is embodied as a cassette, and the  
second part is embodied as cassette holder. The measuring device according to the  
invention is compact, thereby further enhancing user convenience.

The invention will be elucidated hereinbelow on the basis of embodiments and with  
30 reference to the drawings.

In the drawings:

Figure 1 shows in perspective view a first preferred embodiment of the measuring  
device according to the invention;

Figure 2 shows the preferred embodiment of figure 1 with the parts taken apart;  
35 and

Figure 3 shows the preferred embodiment of figure 1 with connections in a  
practical situation.

Corresponding components are designated in the figures with the same reference  
numerals.

Figure 1 shows a measuring device 1 comprising a cassette 2 which is received in a cassette holder 3. Cassette 2 is provided with measuring means, which in this preferred embodiment are adapted to perform liquid pressure measurements in the field of urology. The measuring means comprises three catheters 4 which are each provided with three  
5 ports, i.e. a first port 5a, 5b, 5c for connection of a catheter tube 6a, 6b, 6c (see figure 3), a second venting port 7 and a third port 8 in which is arranged a pressure sensor (not shown). The catheters are further provided with a two-way tap 9 and a non-return valve 10. Such a catheter is described at length in the above stated international patent application WO 02/07595 which is interpolated herein through reference.

10 It is noted in this respect that the catheters 4 are preferably integrated into the cassette. The cassette is provided with recesses on which a close-fitting casing is placed in liquid-tight manner, the recesses and casing together forming the catheters 4. The components of the catheters and the function thereof corresponds however to that of the known catheters, to which reference has been made above.

15 Cassette 2 can be connected releasably to holder 3 by means of a connector 13, this being illustrated in figure 2. It is noted that many types of suitable connector are available commercially for releasable connection of the cassette and the holder.

During use the cassette 2 comes into contact with bodily fluids of the patient and is intended as a disposable article. The cassette is preferably provided with a power supply,  
20 for instance in the form of batteries. In order to prevent reuse, the lifespan of the power supply is geared to the anticipated measuring time required by the measuring means. The lifespan is preferably chosen such that the intended measurement can be performed only once on a patient. The cassette is sealed liquid-tight.

Holder 3 is provided with wireless communication means. The communication  
25 means comprise at least one transmitter, for instance a radio frequency transmitter 11. All peripherals with a suitable receiver can receive and/or process the data sent by the holder. Examples of such peripherals are computers, such as personal computers, including laptops, as well as electronic agendas, the so-called palmtop. If desired, the communication means can also comprise a receiver, preferably a radio frequency  
30 receiver. Suitable wireless communication means are per se known and available commercially. Use is preferably made of a protocol for monitoring the completeness and/or reliability of the received data. Such protocols are per se known and available commercially in the form of software and/or hardware. An example of suitable wireless communication means is the Blue Tooth® system of IBM.

35 Holder 3 is further provided with electronics for reading the measurement values of the pressure sensor and converting thereof into data suitable for transmission. Holder 3 comprises for this purpose means for digitizing the data. The holder can also comprise a pre-amplifier. Such electronics are commercially available and therefore known to a skilled person in the field.

Holder 3 is also provided with means for attaching the holder to a patient, such as adhesive electrodes (not shown), and is suitable for stationary and ambulatory use.

Holder 3 is suitable and intended for reuse. It can be cleaned simply in usual manner, for instance with a wet cloth. The holder can be made splashproof by liquid-tight sealing of the connector for the cassette.

Figure 3 shows measuring device 1 in a practical situation. A catheter tube 6a for rectal measurement of the abdominal pressure is connected to port 5a. A catheter tube 6b for simultaneously measuring the pressure in the urethra and in the bladder is connected to ports 5b and 5c.

The measuring device according to the invention is described in the context of urological applications. It will however be apparent to a skilled person in the field that the measuring means can if desired be replaced by diverse other measuring means for use in other fields of medical science. An example of such measuring means are means for measuring electrophysiological data, for instance measuring electrodes. The measuring device is then suitable for performing a general electrophysiological examination, such as ECG measurements and gastro-enterological measurements. The skilled person will have no difficulty whatever in also using other, per se known measuring means in combination with the above described measuring device.

In figure 3, in addition to the catheters, two measuring electrodes 12 are connected to cassette 2 to perform ECG measurements.

The invention is of course not limited to the shown and described embodiment but comprises any embodiment falling within the scope of the appended claims as seen in the light of the accompanying drawings.